MOTOROLA

MC14001UB
Quad 2-Input NOR Gate

MC14002UB
Dual 4-Input NOR Gate

MC14011UB
Quad 2-Input NAND Gate

MC14012UB
Dual 4-Input NAND Gate

MC14023UB
Triple 3-Input NAND Gate

MC14025UB
Triple 3-Input NOR Gate

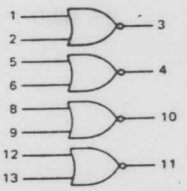
UB-SUFFIX SERIES CMOS GATES

The UB Series logic gates are constructed with P and N channel enhancement mode devices in a single monolithic structure (Complementary MOS). Their primary use is where low power dissipation and/or high noise immunity is desired. The UB set of CMOS gates are inverting non-buffered functions.

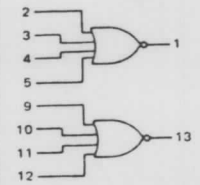
- Quiescent Current = 0.5 nA typ/pkg @ 5 Vdc
- Noise Immunity = 45% of V_{DD} typ
- Supply Voltage Range = 3.0 Vdc to 18 Vdc
- Linear and Oscillator Applications
- Capable of Driving Two Low-power TTL Loads, One Low-power Schottky TTL Load or Two HTL Loads Over the Rated Temperature Range.
- Double Diode Protection on All Inputs
- Pin-for-Pin Replacements for Corresponding CD4000 Series UB Suffix Devices
- Formerly Listed without UB Suffix

LOGIC DIAGRAMS

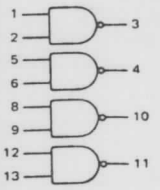
MC14001UB
Quad 2-Input NOR Gate



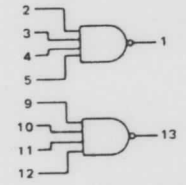
MC14002UB
Dual 4-Input NOR Gate



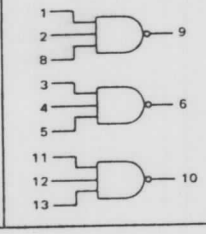
MC14011UB
Quad 2-Input NAND Gate



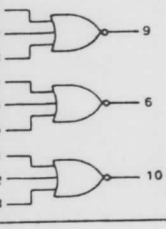
MC14012UB
Dual 4-Input NAND Gate



MC14023UB
Triple 3-Input NAND Gate



MC14025UB
Triple 3-Input NOR Gate

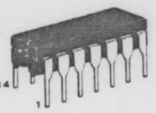


V_{DD} = Pin 14
V_{SS} = Pin 7
for All Devices

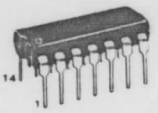
CMOS SSI

(LOW-POWER COMPLEMENTARY MOS)

UB-SERIES GATES



L SUFFIX
CERAMIC PACKAGE
CASE 632



P SUFFIX
PLASTIC PACKAGE
CASE 646

ORDERING INFORMATION

MC14XXXUB — Suffix Denotes
- L Ceramic Package
- P Plastic Package
- A Extended Operating Temperature Range
- C Limited Operating Temperature Range

This device contains circuitry to protect the inputs against damage due to high static voltages or electric fields; however, it is advised that normal precautions be taken to avoid application of any voltage higher than maximum rated voltages to this high impedance circuit. For proper operation it is recommended that V_{in} and V_{out} be constrained to the range $V_{SS} \leq (V_{in}$ or $V_{out}) \leq V_{DD}$.

Unused inputs must always be tied to an appropriate logic voltage level (e.g., either V_{SS} or V_{DD}).

CMOS UB-SERIES GA

MAXIMUM RATINGS (Voltages

Rating
DC Supply Voltage
Input Voltage, All Inputs
DC Current Drain per Pin
Operating Temperature Range – A CL/C
Storage Temperature Range

ELECTRICAL CHARACTER

Characteristic
Output Voltage "0" L V_{in} = V_{DD} or 0
"1" L V_{in} = 0 or V_{DD}
Input Voltage# "0" (V_O = 4.5 Vdc) (V_O = 9.0 Vdc) (V_O = 13.5 Vdc)
"1" (V_O = 0.5 Vdc) (V_O = 1.0 Vdc) (V_O = 1.5 Vdc)
Output Drive Current (AL De So (V_{OH} = 2.5 Vdc) (V_{OH} = 4.6 Vdc) (V_{OH} = 9.5 Vdc) (V_{OH} = 13.5 Vdc)
S (V_{OL} = 0.4 Vdc) (V_{OL} = 0.5 Vdc) (V_{OL} = 1.5 Vdc)
Output Drive Current (CL/C (V_{OH} = 2.5 Vdc) (V_{OH} = 4.6 Vdc) (V_{OH} = 9.5 Vdc) (V_{OH} = 13.5 Vdc)
(V_{OL} = 0.4 Vdc) (V_{OL} = 0.5 Vdc) (V_{OL} = 1.5 Vdc)
Input Current (AL Device
Input Current (CL/CP De
Input Capacitance (V_{in} = 0)
Quiescent Current (AL D (Per Package)
Quiescent Current (CL/ (Per Package)
Total Supply Current* (Dynamic plus Qui Per Gate, C_L = 50

*T_{low} = -55°C for A
T_{high} = +125°C for

#Noise immunity spe
Noise Margin for bo
0.5 Vdc min @
1.0 Vdc min @
1.0 Vdc min @

MOTOROLA

MC14011B
MC14011UB

QUAD 2-INPUT "NAND" GATE

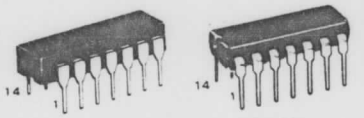
The MC14011B and MC14011UB are constructed with P and N channel enhancement mode devices in a single monolithic structure (Complementary MOS). Their primary use is where low power dissipation and/or high noise immunity is desired.

- Quiescent Current = 0.5 nA typ/pkg @ 5 Vdc
- Noise Immunity = 45% of V_{DD} typ
- Supply Voltage Range = 3.0 Vdc to 18 Vdc
- All Outputs Buffered (MC14011B only)
- Capable of Driving Two Low-power TTL Loads, One Low-power Schottky TTL Load or Two HTL Loads Over the Rated Temperature Range. (MC14011B only)
- Double Diode Protection on All Inputs
- Pin-for-Pin Replacements for CD4011B and CD4011UB

CMOS SSI

(LOW POWER COMPLEMENTARY MOS)

QUAD 2-INPUT "NAND" GATE



L SUFFIX
CERAMIC PACKAGE
CASE 632

P SUFFIX
PLASTIC PACKAGE
CASE 646

ORDERING INFORMATION

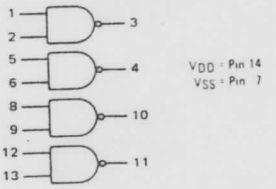
MC14XXXB — Suffix — Denotes
or UB, as applicable
- L — Ceramic Package
- P — Plastic Package
- A — Extended Operating Temperature Range
- C — Limited Operating Temperature Range

MAXIMUM RATINGS (Voltages referenced to V_{SS})

Rating	Symbol	Value	Unit
DC Supply Voltage	V_{DD}	0.5 to +18	Vdc
Input Voltage, All Inputs	V_{in}	0.5 to V_{DD} +0.5	Vdc
DC Current Drain per Pin	I	10	mAdc
Operating Temperature Range AL Device CL, CP Device	T_A	-55 to +125 -40 to +85	°C
Storage Temperature Range	T_{stg}	-65 to +150	°C

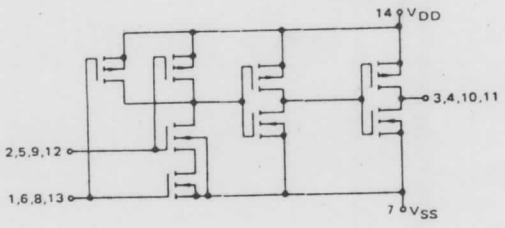
See the MC14001B data sheet for complete characteristics of the B-Series device.
See the MC14001UB data sheet for complete characteristics for the UB device.

LOGIC DIAGRAM

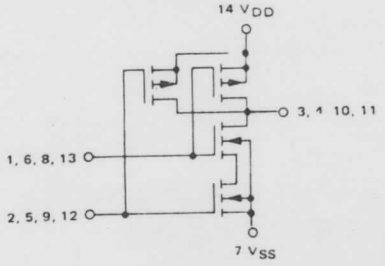


CIRCUIT SCHEMATICS
(1/4 of Device Shown)

MC14011B



MC14011UB



This device contains circuitry to protect the inputs against damage due to high static voltages or electric fields, however, it is advised that normal precautions be taken to avoid application of any voltage higher than maximum rated voltages to this high impedance circuit. For proper operation it is recommended that V_{in} and V_{out} be constrained to the range $V_{SS} \leq (V_{in}$ or $V_{out}) \leq V_{DD}$.
Unused inputs must always be tied to an appropriate logic voltage level (e.g., either V_{SS} or V_{DD}).

MOTOROLA

MC14017B

CMOS MSI

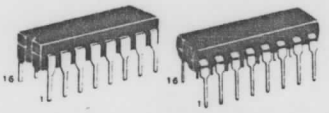
(LOW-POWER COMPLEMENTARY MOS)

DECADE COUNTER/DIVIDER

DECADE COUNTER/DIVIDER

The MC14017B is a five-stage Johnson decade counter with built-in code converter. High-speed operation and spike-free outputs are obtained by use of a Johnson decade counter design. The ten decoded outputs are normally low, and go high only at their appropriate decimal time period. The output changes occur on the positive-going edge of the clock pulse. This part can be used in frequency division applications as well as decade counter or decimal decode display applications.

- Fully Static Operation
- DC Clock Input Circuit Allows Slow Rise Times
- Carry Out Output for Cascading
- 12 MHz (typical) Operation @ V_{DD} = 10 Vdc
- Divide-by-N Counting
- Quiescent Current = 5.0 nA/package Typical @ 5 Vdc
- Supply Voltage Range = 3.0 Vdc to 18 Vdc
- Capable of Driving Two Low-power TTL Loads, One Low-power Schottky TTL Load or Two HTL Loads Over the Rated Temperature Range
- Pin-for-Pin Replacement for CD4017B



L SUFFIX
CERAMIC PACKAGE
CASE 620

P SUFFIX
PLASTIC PACKAGE
CASE 648

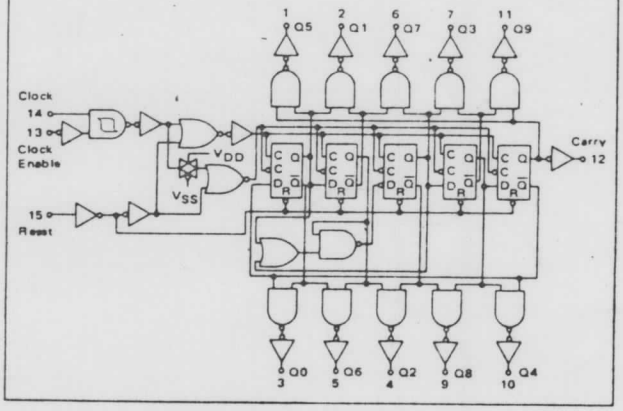
ORDERING INFORMATION

MC14XXXB — Suffix Denotes
- L Ceramic Package
- P Plastic Package
- A Extended Operating Temperature Range
- C Limited Operating Temperature Range

MAXIMUM RATINGS (Voltages referenced to V_{SS})

Rating	Symbol	Value	Unit
DC Supply Voltage	V_{DD}	-0.5 to +18	Vdc
Input Voltage, All Inputs	V_{in}	-0.5 to V_{DD} + 0.5	Vdc
DC Current Drain per Pin	I	10	mAdc
Operating Temperature Range – AL Device CL/CP Device	T_A	-55 to +125 -40 to +85	°C
Storage Temperature Range	T_{stg}	-65 to +150	°C

LOGIC DIAGRAM



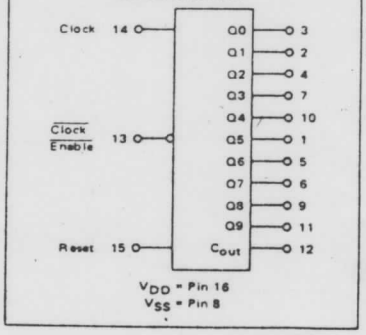
FUNCTIONAL TRUTH TABLE

(Positive Logic)

CLOCK	$\overline{\text{CLOCK}}$ ENABLE	RESET	DECODE OUTPUT = n
0	X	0	n
X	1	0	n
X	X	1	Q0
⌐	0	0	n+1
⌐	X	0	n
X	⌐	0	n
1	⌐	0	n+1

X = Don't Care If n < 5 Carry = "1", Otherwise = "0"

BLOCK DIAGRAM



V_{DD} = Pin 16
V_{SS} = Pin 8

MC14017B

ELECTRICAL CHARACTERIS

Characteristic	
Output Voltage V_{in} = V_{DD} or 0	"0" Leve
V_{in} = 0 or V_{DD}	"1" Lev
Input Voltage#	"0" L
(V_O = 4.5 or 0.5 Vdc) (V_O = 9.0 or 1.0 Vdc) (V_O = 13.5 or 1.5 Vdc)	
(V_O = 0.5 or 4.5 Vdc) (V_O = 1.0 or 9.0 Vdc) (V_O = 1.5 or 13.5 Vdc)	"1" L
Output Drive Current (AL Device)	
(V_{OH} = 2.5 Vdc)	Source
(V_{OH} = 4.6 Vdc)	
(V_{OH} = 9.5 Vdc)	
(V_{OH} = 13.5 Vdc)	
(V_{OL} = 0.4 Vdc)	Sink
(V_{OL} = 0.5 Vdc)	
(V_{OL} = 1.5 Vdc)	
Output Drive Current (CL/CP Dev	
(V_{OH} = 2.5 Vdc)	Source
(V_{OH} = 4.6 Vdc)	
(V_{OH} = 9.5 Vdc)	
(V_{OH} = 13.5 Vdc)	
(V_{OL} = 0.4 Vdc)	Sink
(V_{OL} = 0.5 Vdc)	
(V_{OL} = 1.5 Vdc)	
Input Current (AL Device)	
Input Current (CL/CP Device)	
Input Capacitance (V_{in} = 0)	
Quiescent Current (AL Device) (Per Package)	
Quiescent Current (CL/CP Devi (Per Package)	
Total Supply Current**† (Dynamic plus Quiescent, Per Package) (C_L = 50 pF on all outputs, buffers switching)	

*T_{low} = -55°C for AL Device
T_{high} = +125°C for AL Dev
#Noise immunity specified fo
Noise Margin for both "1" a

†To calculate total supply c
$I_T(C_L) = I_T(50\ pF) +$
where: I_T is in μA (per pa
**The formulas given are for

This d
the inp
voltage
advise
to avo
than
imped

MOTOROLA

MC14049UB
MC14050B

CMOS SSI

(LOW-POWER COMPLEMENTARY MOS)

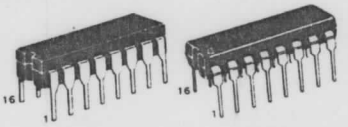
HEX BUFFERS

Inverting – MC14049UB
Noninverting – MC14050B

HEX BUFFERS

The MC14049UB hex inverter/buffer and MC14050B noninverting hex buffer are constructed with MOS P-channel and N-channel enhancement mode devices in a single monolithic structure. These complementary MOS devices find primary use where low power dissipation and/or high noise immunity is desired. These devices provide logic-level conversion using only one supply voltage, V_{CC}. The input-signal high level (V_{IH}) can exceed the V_{CC} supply voltage for logic-level conversions. Two TTL/DTL Loads can be driven when the devices are used as CMOS-to-TTL/DTL converters (V_{CC} = 5.0 V, $V_{OL} \leq$ 0.4 V, $I_{OL} \geq$ 3.2 mA). Note that pin 16 is not connected internally on these devices; consequently connections to this terminal will not affect circuit operation.

- High Source and Sink Currents
- High-to-Low Level Converter
- Quiescent Current = 2.0 nA/package typical @ 5 Vdc
- Supply Voltage Range = 3.0 Vdc to 18 Vdc
- Meets JEDEC UB Specifications—MC14049UB
  Meets JEDEC B Specification—MC14050B



L SUFFIX
CERAMIC PACKAGE
CASE 620

P SUFFIX
PLASTIC PACKAGE
CASE 648

ORDERING INFORMATION

MC14XXXUB
MC14XXXB

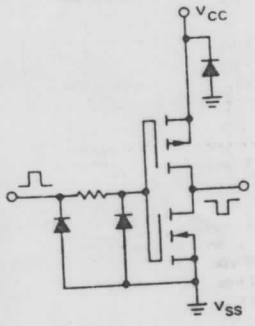
Suffix Denotes
- L Ceramic Package
- P Plastic Package
- A Extended Operating Temperature Range
- C Limited Operating Temperature Range

MAXIMUM RATINGS (Voltages referenced to V_{SS}, Pin 8)

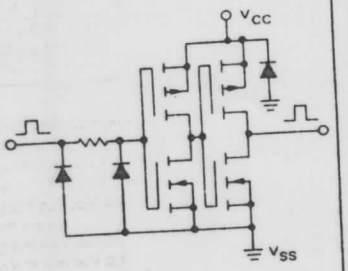
Rating	Symbol	Value	Unit
DC Supply Voltage	V_{DD}	−0.5 to +18	Vdc
Input Voltage, All Inputs	V_{in}	−0.5 to +18	Vdc
DC Current Drain per Input Pin	I	10	mAdc
DC Current Drain per Output Pin	I	45	mAdc
Operating Temperature Range — AL Device	T_A	−55 to +125	°C
CL/CP Device		−40 to +85	
Storage Temperature Range	T_{stg}	−65 to +150	°C

CIRCUIT SCHEMATIC
(1/6 OF CIRCUIT SHOWN)

MC14049UB

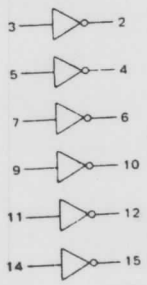


MC14050B



LOGIC DIAGRAMS

MC14049UB



NC = Pin 13, 16
V_{SS} = Pin 8
V_{CC} = Pin 1

MC14050B

NC = Pin 13, 16
V_{SS} = Pin 8
V_{CC} = Pin 1

MOTOROLA

MC14075B

TRIPLE 3–INPUT "OR" GATE

The B Series logic gates are constructed with P and N channel enhancement mode devices in a single monolithic structure (Complementary MOS). Their primary use is where low power dissipation and/or high noise immunity is desired.

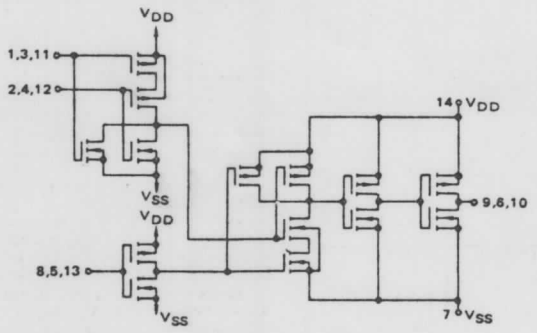
- Quiescent Current = 0.5 nA typ/pkg @ 5 Vdc
- Noise Immunity = 45% of V_{DD} typ
- Supply Voltage Range = 3.0 Vdc to 18 Vdc
- All Outputs Buffered
- Capable of Driving Two Low-power TTL Loads, One Low-power Schottky TTL Load or Two HTL Loads Over the Rated Temperature Range.
- Double Diode Protection on All Inputs
- Pin-for-Pin Replacement for CD4075B

MAXIMUM RATINGS (Voltages referenced to V_{SS})

Rating	Symbol	Value	Unit
DC Supply Voltage	V_{DD}	-0.5 to +18	Vdc
Input Voltage, All Inputs	V_{in}	-0.5 to V_{DD} +0.5	Vdc
DC Current Drain per Pin	I	10	mAdc
Operating Temperature Range - AL Device CL/CP Device	T_A	-55 to +125 -40 to +85	°C
Storage Temperature Range	T_{stg}	-65 to +150	°C

See the MC14001B data sheet for complete characteristics for this device.

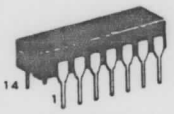
CIRCUIT SCHEMATICS
(1/3 of Device Shown)



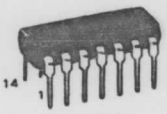
CMOS SSI

(LOW-POWER COMPLEMENTARY MOS)

TRIPLE 3-INPUT "OR" GATE



L SUFFIX
CERAMIC PACKAGE
CASE 632

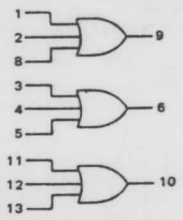


P SUFFIX
PLASTIC PACKAGE
CASE 646

ORDERING INFORMATION

MC14XXXB — Suffix Denotes
- L Ceramic Package
- P Plastic Package
- A Extended Operating Temperature Range
- C Limited Operating Temperature Range

LOGIC DIAGRAM



This device contains circuitry to protect the inputs against damage due to high static voltages or electric fields; however, it is advised that normal precautions be taken to avoid application of any voltage higher than maximum rated voltages to this high impedance circuit. For proper operation it is recommended that V_{in} and V_{out} be constrained to the range $V_{SS} \leq (V_{in}$ or $V_{out}) \leq V_{DD}$.
Unused inputs must always be tied to an appropriate logic voltage level (e.g., either V_{SS} or V_{DD}).

MOTOROLA

MC14082B

DUAL 4-INPUT "AND" GATE

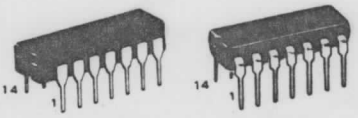
The B Series logic gates are constructed with P and N channel enhancement mode devices in a single monolithic structure (Complementary MOS). Their primary use is where low power dissipation and/or high noise immunity is desired.

- Quiescent Current = 0.5 nA typ/pkg @ 5 Vdc
- Noise Immunity = 45% of V_{DD} typ
- Supply Voltage Range = 3.0 Vdc to 18 Vdc
- All Outputs Buffered
- Capable of Driving Two Low-power TTL Loads, One Low-power Schottky TTL Load or Two HTL Loads Over the Rated Temperature Range.
- Double Diode Protection on All Inputs
- Pin-for-Pin Replacement for CD4082B

CMOS SSI

(LOW-POWER COMPLEMENTARY MOS)

DUAL 4-INPUT "AND" GATE



L SUFFIX
CERAMIC PACKAGE
CASE 632

P SUFFIX
PLASTIC PACKAGE
CASE 646

ORDERING INFORMATION

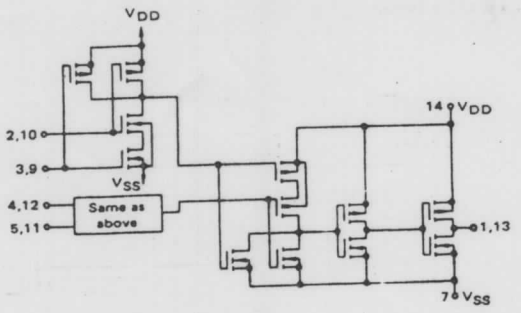
MC14XXXB — Suffix — Denotes
- L — Ceramic Package
- P — Plastic Package
- A — Extended Operating Temperature Range
- C — Limited Operating Temperature Range

MAXIMUM RATINGS (Voltages referenced to V_{SS})

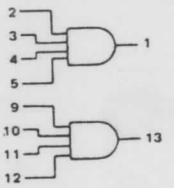
Rating	Symbol	Value	Unit
DC Supply Voltage	V_{DD}	-0.5 to +18	Vdc
Input Voltage, All Inputs	V_{in}	-0.5 to V_{DD} +0.5	Vdc
DC Current Drain per Pin	I	10	mAdc
Operating Temperature Range AL Device	T_A	-55 to +125	°C
CL/CP Device		-40 to +85	
Storage Temperature Range	T_{stg}	-65 to +150	°C

See the MC14001B data sheet for complete characteristics for this device.

CIRCUIT SCHEMATICS
(1/2 of Device Shown)



LOGIC DIAGRAM



V_{DD} = Pin 14
V_{SS} = Pin 7

This device contains circuitry to protect the inputs against damage due to high static voltages or electric fields; however, it is advised that normal precautions be taken to avoid application of any voltage higher than maximum rated voltages to this high impedance circuit. For proper operation it is recommended that V_{in} and V_{out} be constrained to the range $V_{SS} \leq (V_{in}$ or $V_{out}) \leq V_{DD}$.
Unused inputs must always be tied to an appropriate logic voltage level (e.g., either V_{SS} or V_{DD}).

MOTOROLA

MC14093B

Advance Information

CMOS SSI

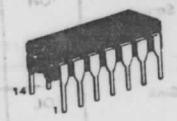
(LOW-POWER COMPLEMENTARY MOS)

QUAD 2-INPUT "NAND" SCHMITT TRIGGER

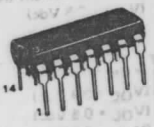
QUAD 2-INPUT "NAND" SCHMITT TRIGGER

The MC14093B Schmitt trigger is constructed with MOS P-channel and N-channel enhancement mode devices in a single monolithic structure. These devices find primary use where low power dissipation and/or high noise immunity is desired. The MC14093B may be used in place of the MC14011B quad 2-input NAND gate for enhanced noise immunity or to "square up" slowly changing waveforms.

- Quiescent Current = 0.5 nA typ/pkg @ 5 Vdc
- Supply Voltage Range = 3.0 Vdc to 18 Vdc
- Capable of Driving Two Low-Power TTL Loads, One Low-Power Schottky TTL Load or Two HTL Loads Over the Rated Temperature Range
- Double Diode Protection on All Inputs
- Pin-for-Pin Compatible with CD4093
- Can be Used to Replace MC14011B



L SUFFIX
CERAMIC PACKAGE
CASE 632



P SUFFIX
PLASTIC PACKAGE
CASE 646

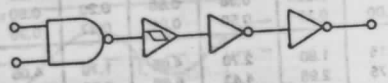
ORDERING INFORMATION

MC14XXXB — Suffix Denotes
- L Ceramic Package
- P Plastic Package
- A Extended Operating Temperature Range
- C Limited Operating Temperature Range

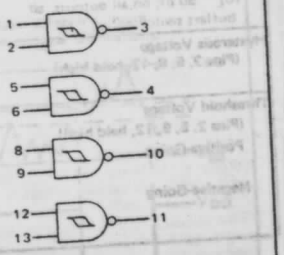
MAXIMUM RATINGS (Voltages referenced to V_{SS})

Rating	Symbol	Value	Unit
DC Supply Voltage	V_{DD}	-0.5 to +18	Vdc
Input Voltage, All Inputs	V_{in}	-0.5 to V_{DD} + 0.5	Vdc
DC Current Drain per Pin	I	10	mAdc
Operating Temperature Range — AL Device	T_A	-55 to +125	°C
CL/CP Device		-40 to +85	
Storage Temperature Range	T_{stg}	-65 to +150	°C

EQUIVALENT CIRCUIT SCHEMATIC
(1/4 OF CIRCUIT SHOWN)



LOGIC DIAGRAM



V_{DD} = Pin 14
V_{SS} = Pin 7

This device contains circuitry to protect the inputs against damage due to high static voltages or electric fields; however, it is advised that normal precautions be taken to avoid application of any voltage higher than maximum rated voltages to this high impedance circuit. For proper operation it is recommended that V_{in} and V_{out} be constrained to the range $V_{SS} \le (V_{in}$ or $V_{out}) \le V_{DD}$.
Unused inputs must always be tied to an appropriate logic voltage level (e.g., either V_{SS} or V_{DD}).

This is advance information and specifications are subject to change without notice.

MOTOROLA

MC14528B

CMOS MSI

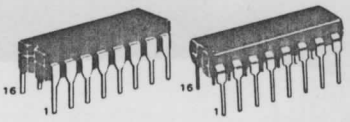
(LOW-POWER COMPLEMENTARY MOS)

DUAL
RETRIGGERABLE/RESETTABLE
MONOSTABLE MULTIVIBRATOR

DUAL MONOSTABLE MULTIVIBRATOR

The MC14528B is a dual, retriggerable, resettable monostable multivibrator. It may be triggered from either edge of an input pulse, and will produce an accurate output pulse over a wide range of widths, the duration and accuracy of which are determined by the external timing components, C_X and R_X.

- Separate Reset Available
- Quiescent Current = 5.0 nA/package typical @ 5 Vdc
- Diode Protection on All Inputs
- Triggerable from Leading or Trailing Edge Pulse
- Supply Voltage Range = 3.0 Vdc to 18 Vdc
- Capable of Driving Two Low-power TTL Loads, One Low-power Schottky TTL Load or Two HTL Loads Over the Rated Temperature Range
- See MC14538B Data Sheet for Applications Requiring Precise Control of Output Pulse Width



L SUFFIX
CERAMIC PACKAGE
CASE 620

P SUFFIX
PLASTIC PACKAGE
CASE 648

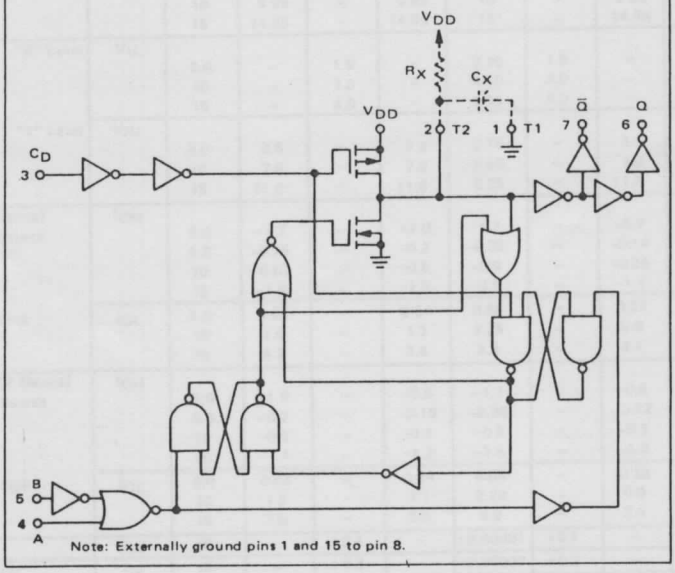
ORDERING INFORMATION

MC14XXXB — Suffix Denotes
- L Ceramic Package
- P Plastic Package
- A Extended Operating Temperature Range
- C Limited Operating Temperature Range

MAXIMUM RATINGS (Voltages referenced to V_{SS})

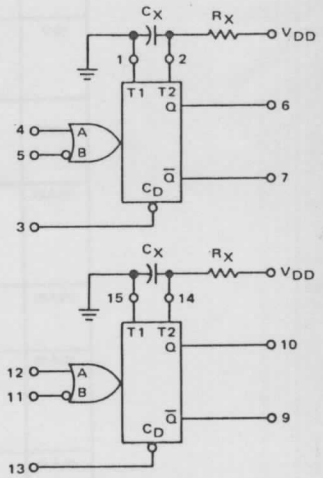
Rating	Symbol	Value	Unit
DC Supply Voltage	V_{DD}	-0.5 to +18	Vdc
Input Voltage, All Inputs	V_{in}	-0.5 to V_{DD} + 0.5	Vdc
DC Current Drain per Pin	I	10	mAdc
Operating Temperature Range – AL Device CL/CP Device	T_A	-55 to +125 -40 to +85	°C
Storage Temperature Range	T_{stg}	-65 to +150	°C

LOGIC DIAGRAM
(1/2 of Device Shown)



Note: Externally ground pins 1 and 15 to pin 8.

BLOCK DIAGRAM



R_X and C_X are external components.

V_{DD} = Pin 16
V_{SS} = Pin 8

FIGURE 1 – OUTPUT SOURCE CURRENT TEST CIRCUIT

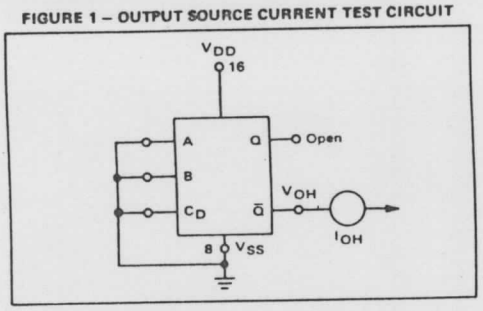


FIGURE 2 – OUTPUT SINK CURRENT TEST CIRCUIT

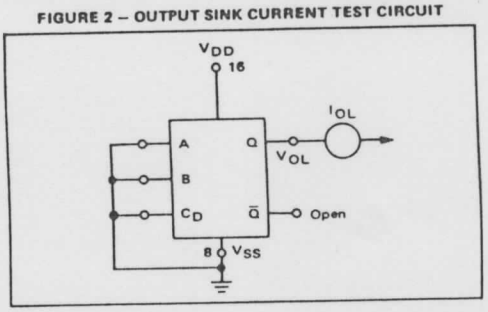


FIGURE 3 – POWER DISSIPATION TEST CIRCUIT AND WAVEFORMS

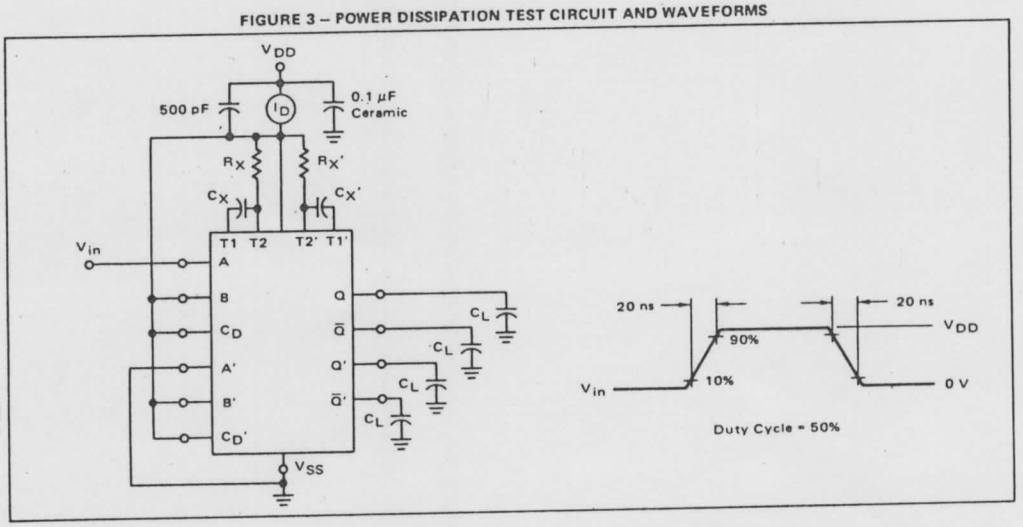
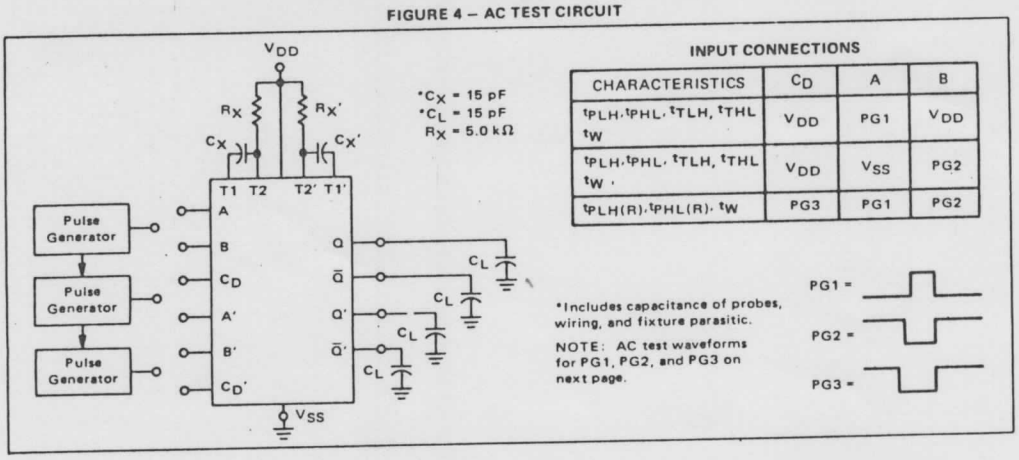


FIGURE 4 – AC TEST CIRCUIT



INPUT CONNECTIONS

CHARACTERISTICS	C_D	A	B
t_{PLH}, t_{PHL}, t_{TLH}, t_{THL} t_W	V_{DD}	PG1	V_{DD}
t_{PLH}, t_{PHL}, t_{TLH}, t_{THL} t_W	V_{DD}	V_{SS}	PG2
$t_{PLH(R)}$, $t_{PHL(R)}$, t_W	PG3	PG1	PG2

*Includes capacitance of probes, wiring, and fixture parasitic.

NOTE: AC test waveforms for PG1, PG2, and PG3 on next page.

FIGURE 5 – AC TEST WAVEFORMS

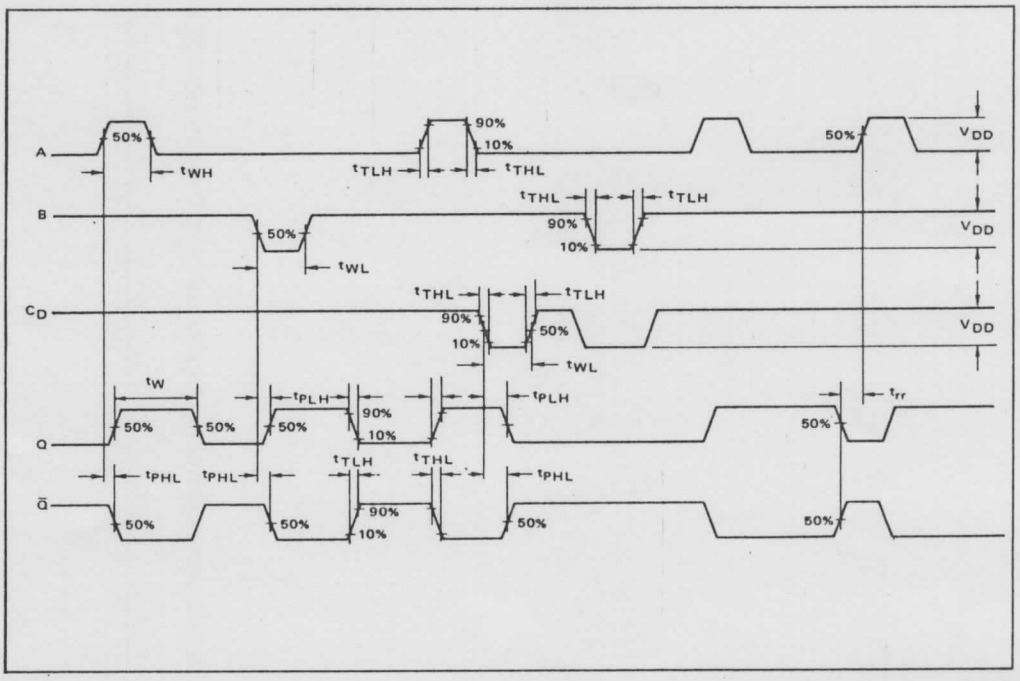


FIGURE 6 – NORMALIZED PULSE WIDTH versus TEMPERATURE

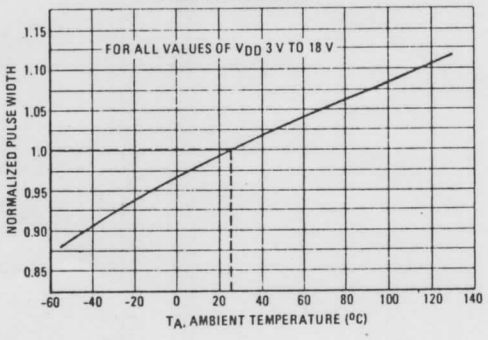
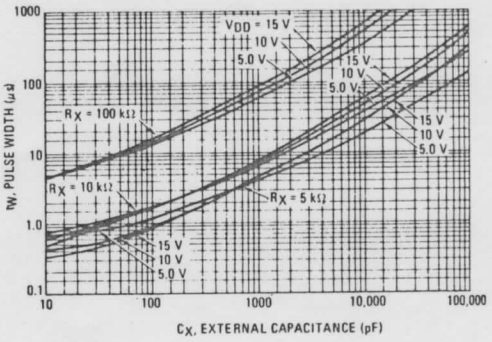


FIGURE 7 – PULSE WIDTH versus C_X



MOTOROLA

MC14538B

CMOS MSI

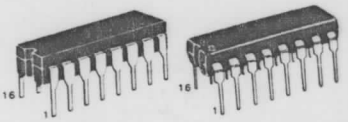
(LOW-POWER COMPLEMENTARY MOS)

DUAL PRECISION RETRIGGERABLE/RESETTABLE MONOSTABLE MULTIVIBRATOR

DUAL PRECISION RETRIGGERABLE/RESETTABLE MONOSTABLE MULTIVIBRATOR

The MC14538B is a dual, retriggerable, resettable monostable multivibrator. It may be triggered from either edge of an input pulse, and will produce an accurate output pulse over a wide range of widths, the duration and accuracy of which are determined by the external timing components, C_X and R_X. Linear CMOS techniques allow more precise control of output pulse width.

- ±1.0% Typical Pulsewidth Variation from Part to Part
- ±0.5% Typical Pulsewidth Variation over Temperature Range
- New Formula: T = RC (T in seconds, R in ohms, C in farads)
- Pulse Width Range = 10 μs to ∞
- Symmetrical Output Sink and Source Capability
- Latched Trigger Inputs
- Separate Latched Reset Inputs
- Quiescent Current (Standby) = 5.0 nA/package typical @ 5 Vdc
- 3.0 Vdc to 18 Vdc Operational Limits
- Triggerable from Positive or Negative-Going Edge
- Capable of Driving Two Low-power TTL Loads, One Low-power Schottky TTL Load or Two HTL Loads Over the Rated Temperature Range
- Pin-for-pin Compatible with MC14528B and CD4528B (CD4098)
- For Pulse Widths Less Than 10 μs the MC14528B is Recommended



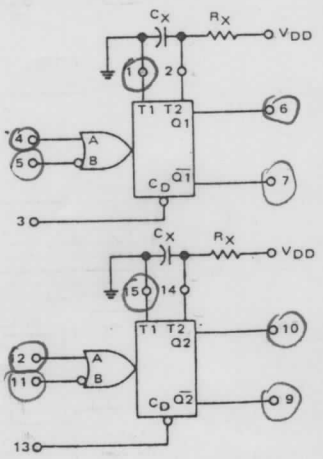
L SUFFIX
CERAMIC PACKAGE
CASE 620

P SUFFIX
PLASTIC PACKAGE
CASE 648

ORDERING INFORMATION

MC14XXXB — Suffix Denotes
- L Ceramic Package
- P Plastic Package
- A Extended Operating Temperature Range
- C Limited Operating Temperature Range

BLOCK DIAGRAM



R_X and C_X are external components.

V_{DD} = Pin 16
V_{SS} = Pin 8, Pin 1, Pin 15

MAXIMUM RATINGS (Voltages referenced to V_{SS})

Rating	Symbol	Value	Unit
DC Supply Voltage	V_{DD}	−0.5 to +18	Vdc
Input Voltage, All Inputs	V_{in}	−0.5 to V_{DD} + 0.5	Vdc
DC Current Drain per Pin	I	10	mAdc
Operating Temperature Range — AL Device CL/CP Device	T_A	−55 to +125 −40 to +85	°C
Storage Temperature Range	T_{stg}	−65 to +150	°C

This device contains circuitry to protect the inputs against damage due to high static voltages or electric fields; however, it is advised that normal precautions be taken to avoid application of any voltage higher than maximum rated voltages to this high-impedance circuit. For proper operation it is recommended that V_{in} and V_{out} be constrained to the range $V_{SS} \leq (V_{in}$ or $V_{out}) \leq V_{DD}$.

Unused inputs must always be tied to an appropriate logic voltage level (e.g., either V_{SS} or V_{DD}).

ELECTRICAL CHARA

Characteris
Output Voltage V_{in} = V_{DD} or 0
V_{in} = 0 or V_{DD}
Input Voltage# (V_O = 4.5 or 0.5 Vdc) (V_O = 9.0 or 1.0 Vdc) (V_O = 13.5 or 1.5 Vdc
(V_O = 0.5 or 4.5 Vdc) (V_O = 1.0 or 9.0 Vdc) (V_O = 1.5 or 13.5 Vdc
Output Drive Current (AL (V_{OH} = 2.5 Vdc) (V_{OH} = 4.6 Vdc) (V_{OH} = 9.5 Vdc) (V_{OH} = 13.5 Vdc) (V_{OL} = 0.4 Vdc) (V_{OL} = 0.5 Vdc) (V_{OL} = 1.5 Vdc)
Output Drive Current (CL (V_{OH} = 2.5 Vdc) (V_{OH} = 4.6 Vdc) (V_{OH} = 9.5 Vdc) (V_{OH} = 13.5 Vdc) (V_{OL} = 0.4 Vdc) (V_{OL} = 0.5 Vdc) (V_{OL} = 1.5 Vdc)
Input Current, Pin 2 or 1
Input Current, Other Inp
Input Current, Other Inp
Input Capacitance, Pin 2
Input Capacitance, Other (V_{in} = 0)
Quiescent Current (AL D (Per Package)
Quiescent Current (CL/ (Per Package)
Quiescent Current, Activ (Q1 = Logic 1) (Q2 = Logic 0)
**Total Supply Current capacitance (C_L) timing network (R

*T_{low} = −55°C for AL
T_{high} = +125°C for AL
#Noise immunity specifi
Noise Margin both "1"

**The formulas given ar

TYPICAL APPLICATIONS

FIGURE 12 – Retriggerable Monostables Circuitry

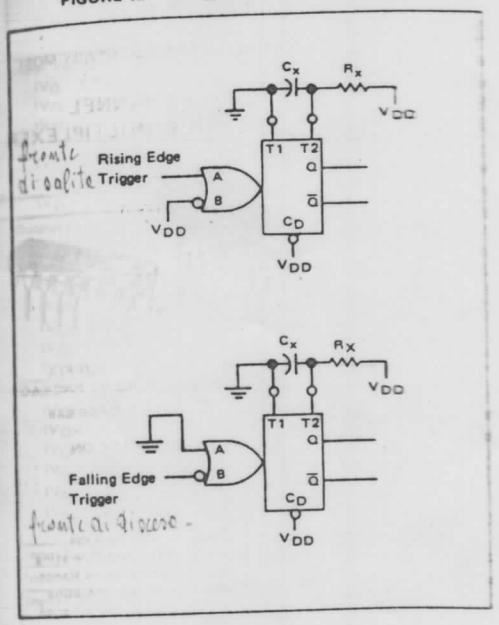


FIGURE 13 – Non-retriggerable Monostables Circuitry

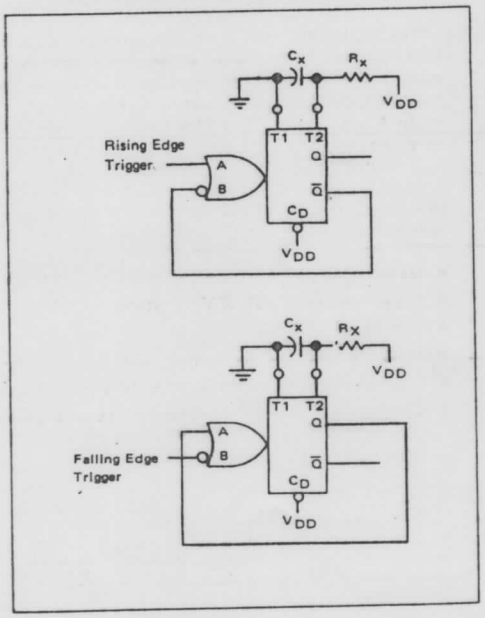


FIGURE 14 – Reduction of Power-Up Output Pulse Width

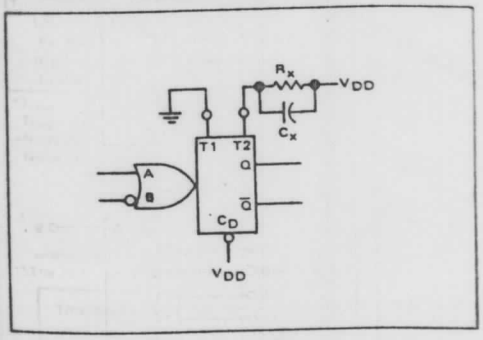


FIGURE 15 – Connection of Unused Sections